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Ministry of Forests and Range

Public Influenence on Reforestation in British Columbia

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Introduction

British Columbia is a very large and diverse province, spanning 11 degrees of latitude, from the 49th to the 60th parallels, and 25 degrees of longitude. The land area is about 95 million hectares, roughly four times the size of Great Britain (Figure 1). Only 30 nations in the world are larger than B.C. It is the third largest province in Canada.

Figure 1. British Columbia is roughly four times the size of Great Britain and has 7% of the world's softwood growing stock.

Issues such as wilderness preservation, biodiversity, old growth, and clearcutting commonly arise in the media. One issue that has subsided, however, is that of inadequate reforestation. This paper follows the development of reforestation in British Columbia and the history of public opinion on this subject. It also describes some of the key changes in forest policy and silviculture practices which are behind the recent positive changes in public opinion.

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- **Text Only Version**

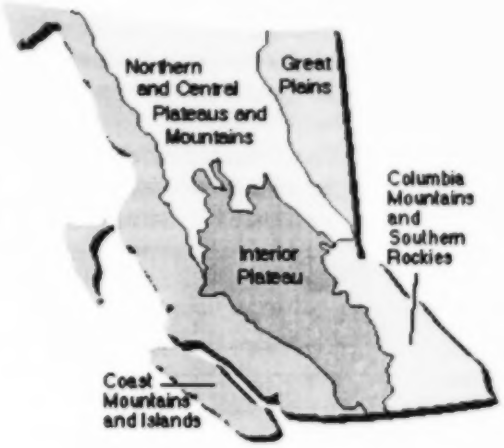
Prepared for the Third Global Conference on Paper & the Environment
London, England
March, 1995

About British Columbia

B.C.'s Physiography and Tree Species

The climate of British Columbia varies tremendously, ranging from almost Mediterranean conditions on some parts of the coast to sub-arctic conditions at high elevations and in the far north. Forests dominate the vegetation but there are also extensive areas of grasslands, scrub and tundra.

Figure 2. British Columbia has five broad physiographic regions, reflecting the great biological diversity present in the province.

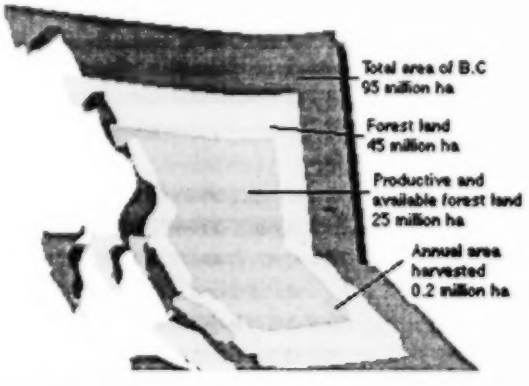


B.C. has five broad physiographic regions, each representing a distinctive combination of climate, landform, vegetation, and soil (Figure 2). The commercial tree species vary significantly between these regions, reflecting the great biological diversity present in the province (Table 2, Appendix).

Importance of Forestry to British Columbia

About 85% of British Columbia is designated as "Provincial Forest" which is owned by the province and is managed for all resource values, not just timber.

Figure 3. Slightly more than one quarter of the area of British Columbia is considered forest land available for harvesting.



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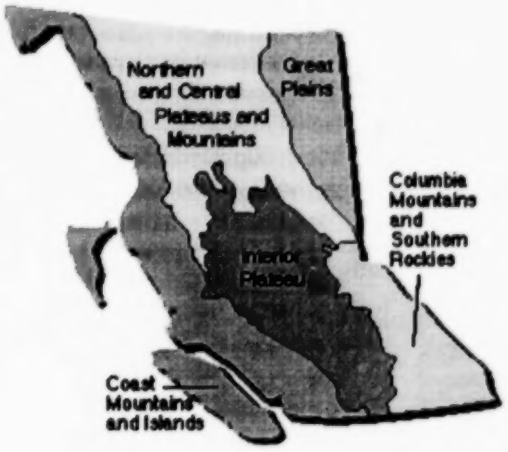

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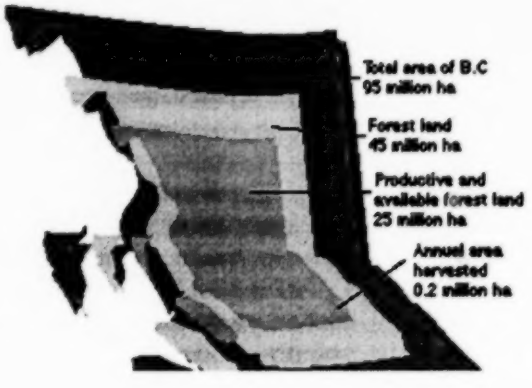
Total area of B.C 95 million ha
Forest land 45 million ha
Productive and available forest land 25 million ha
Annual area harvested 0.2 million ha

Not all Provincial Forest is actual forest land, however. About one-half of B.C. is covered in forest, and about one-half of this, or one-quarter of

the entire province, is considered available and suitable for timber harvesting (Figure 3).

About 96% of the total forest volume of 8.6 billion m3 is coniferous **1**, giving British Columbia approximately half of the national softwood inventory and 7% of the world softwood inventory (Council of Forest Industries, 1993).

In fiscal year 1993/94, almost 70 million cubic metres were harvested from 181 000 hectares . Eighty-seven per cent of the harvest was by means of clearcutting, with the balance being harvested through a variety of selection systems. More than 95% of the total harvest consists of lodgepole pine; several species of spruce, hemlock, and true fir; Douglas fir; and western red cedar.

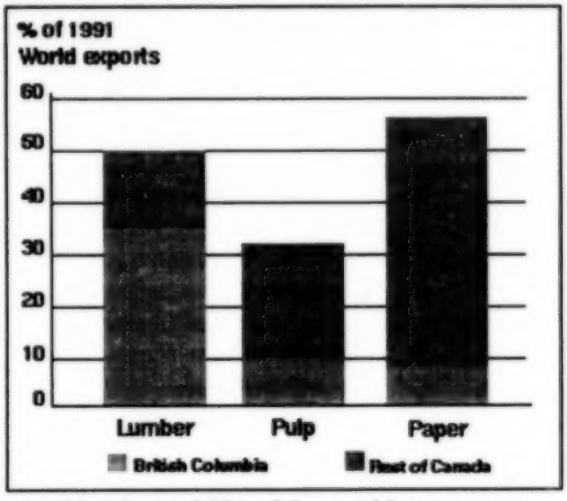

Figure 4. B. C. is the source of a significant proportion of the world 's exported forest products.

Canada is the world's largest exporter of manufactured forest products, and British Columbia is a significant contributor to this, particularly in lumber exports (Figure 4). In 1991, B. C. shipped 34% of the world lumber, 10% of the world pulp, and 9% of the world newspaper exports (Council of Forest Industries, 1992 & 1993). B.C. forestry exports to other countries in 1992 were valued at $9.5 billion or 59 % of provincial exports (B.C. Ministry of Finance and Corporate Relations, 1993). About twenty-five percent of B.C.'s pulp and paper exports, valued at close to $1 billion annually, goes to the European Community (Council of Forest Industries, 1993). Studies show that:

- approximately 17% of the total provincial Gross Domestic Product in recent years can be attributed to the forestry sector (Forest Resources Commission, 1991) (Vancouver Board of Trade, 1994); **2**

- more than 130 communities in the province are largely dependent on the forest industry (White et al. 1986); and

- one out of every six jobs in the province is directly or indirectly derived from forestry (Vancouver Board of Trade. 1994).

1. 1 billion = I 000 000 000
2 Includes direct, indirect and induced impacts.

History of Reforestation and Related Public Opinion

NSR as a Measure of Success

The success of the reforestation program in British Columbia is readily measured by the amount of not satisfactorily restocked (NSR) forest land that exists, particularly that which is attributable to timber harvesting. NSR is divided into current NSR, which is the acceptable delay in the restocking of a cutover or burned area, and backlog NSR, which is beyond the regeneration delay period and therefore is not acceptable. The backlog focus in B.C. has primarily been on good and medium forest sites which are accessible and economically viable to treat. A history of NSR is presented in Table 1.

Table 1

Year	Total NSR - all sites	Total NSR after factoring for expected regeneration	Backlog NSR - G&M sites
1955	4 801 409		360 000
1976	3 888 034		342 386
1984	3 553 900	1 635 000	738 000*
1988	3 721 000		553 000*
1992	3 617 000	1 362 000	273 000*
1993	3 240 000	1 290 000	238 000*

*backlog NSR on good and medium sites harvested before 1982

Table 1. The success of the reforestation program can he measured by the amount of outstanding NSR.

Early 1900's

In the early 1900's, reforestation was minimal. The forests were seemingly endless and professional opinion was that tree planting was largely uneconomic. The first plantations in the province were established about 1930 and it wasn't until 1941 that the cumulative total trees planted surpassed 10 million.

Mid - 1900's

In his 1956 royal commission report, the Honourable Gordon Sloan found the 7 million trees planted on the coast in 1955 to be totally inadequate . Furthermore, almost all of the trees planted were a single

species, Douglas fir. He suggested an annual planting program of 38.4 million seedlings to meet current reforestation needs as well as reclaim the backlog NSR on the coast (Sloan).

Sloan's recommended program never took place, however, and by 1965 planting had increased to only about 18 million trees for the entire province. In 1965 a more specific target was adopted. It was estimated that one-third of the acreage logged would require planting, which at the level of logging at the time, implied a need for 75 million seedlings annually (Pearse, 1976). The rallying cry became "75 by 75", standing for a target of 75 million seedlings to be planted by 1975. While this, theoretically, would take care of current reforestation, it did not address the backlog.

This time, total planting came close to the target with 62 million seedlings planted in 1975. But in the meantime the goalposts had changed - more area was being harvested annually and the backlog was still ever-present.

In his 1976 royal commission report, Dr. Peter Pearse noted that "Professional foresters have expressed much concern in recent years about the "backlog" of unstocked lands". He reported the total NSR in the province to be 3.9 million ha, of which 343 000 ha was estimated to be backlog NSR on good and medium sites. Pearse did not propose a specific program, other than to state that "... provisions must be made to ensure the establishment of new crops on lands denuded by logging or fire." (Pearse).

1980's - early 1990's

The first program to include funds to specifically tackle the backlog NSR was a $50 million federal-provincial funding agreement which ran from 1979 to 1984. However, because there was insufficient funding for basic silviculture, the backlog continued to grow, additions outpacing reductions.

By 1980 the environmental movement was gaining momentum and the reforestation issue was becoming commonly reported in the news media. In 1980, there were over 10 major articles related to this matter in the Vancouver or Toronto daily newspapers. Public concern seemed to diminish, however, when the severe recession of the early 1980's took control of the headlines.

The fact that the backlog was continuing to grow was confirmed in a 1984 Forest and Range Resource Analysis carried out by the Ministry of Forests. The analysis reported NSR as of December 31, 1983, to be 738 000 ha on good and medium forest sites. The report estimated the annual losses to NSR between 1979 and 1983 to be 19 000 ha per year or 9% of the average annual area logged or burned by wildfire.

By the end of the decade public concern returned to a very high level. In a 1989 poll, 82% of British Columbians responded that too few trees were being planted (Environics). In a 1991 poll, 16% of those sampled on an 'unaided' basis stated reforestation as the forest management issue of greatest concern, second only to the issue of clearcutting (B. Farrell & Associates, 1991). While not necessarily a critical issue on which the election was decided, reforestation was a key topic in the election platforms of the major political parties during the 1991 provincial election (B.C. New Democrats, 1991) .

Today

Today, the matter of inadequate reforestation in British Columbia seems to be a non-issue. The last article devoted primarily to reforestation in the Vancouver Sun newspaper was in 1992. The latest poll results in 1994 indicate that only 7% of British Columbians feel reforestation- to be the most important environmental issue facing B.C. today (MarkTrend, 1994). Interestingly, back in 1991, ahead of the change in public opinion by a year or two, 77% of B.C. professional foresters responding to a poll felt that the reforestation performance in the province was excellent (Omnifacts, 1991).

Clearly, there has been dramatic change in public opinion regarding reforestation. The next section reviews some of the factors behind this change.

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Factors Behind the Recent Change in Public Opinion

New Government Policies and Funding

1985 - Forest Resource Development Agreement

The turning of the reforestation "tide" in British Columbia began back in 1985, with the commencement of the 1985 - 1990 Canada-British

Columbia Forest Resource Development Agreement (FRDA). This agreement provided $200 million targeted directly at the Backlog NSR. Significantly. the agreement also committed the province to no net increase in the NSR backlog. The accepted figure for the backlog became the 738 000 ha reported in the 1984 resource analysis, and is what the Ministry of Forests has been tracking ever since. By the end of the agreement on March 31, 1990, backlog NSR had been reduced by over 40%.

1987 - Forest Policy and Legislation Changes

The next major event came in late 1987/early 1988 when the Government of British Columbia amended the Forest Act and introduced accompanying regulations on reforestation practices. As a result of this legislation:

- before harvesting Crown timber, a silviculture prescription must be prepared, submitted and approved;

- after harvesting, a free-growing crop of ecologically and commercially suitable trees must be established to the standards and within the time frames set out in the silviculture prescription;

- companies with long term tenures must bear the cost of reforesting the areas they harvest, including the cost of tree seedlings;

- where reforestation remains a ministry responsibility, silviculture costs are recovered through timber pricing; and

- the government committed itself to reforesting areas lost to wildfire or insect infestations, and to paying for the reforestation of areas harvested by industry between 1982 and 1987 (with FRDA targeted to areas harvested pre-1982).

These actions effectively stopped the leakage from current to backlog NSR. The latest audits of recently harvested areas where reforestation is

in progress show over 92% of audited areas being projected as likely to be successful. By law, those areas not projected to be successful must be remedied.

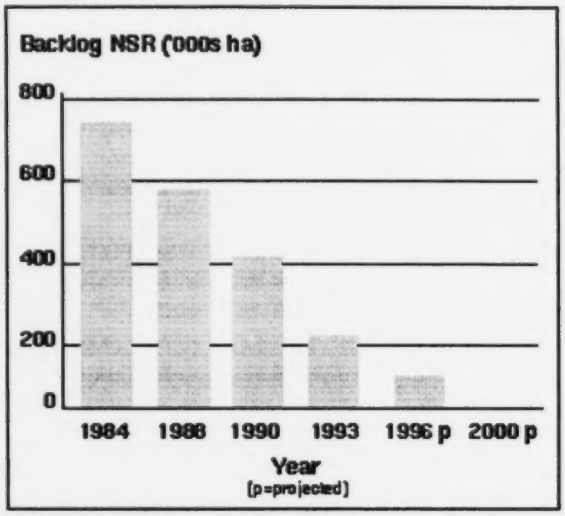

Figure 5. Backlog NSR on good and medium sites has decreased from 738 000 ha in 1984 to 238 000 ha in 1993. The goal is to entirely eliminate this backlog by the year 2000.

1990 - Commitment to Eliminate the Backlog

In 1990, with FRDA I having expired, the government of B.C. made a commitment to eliminate the backlog NSR on good and medium sites by the year 2000. This backlog has now been reduced, through a combination of planting and detailed surveys, from 738 000 ha in 1984 to 238 000 ha in 1993 (Figure 5). However, as we come closer to accomplishing the goal of eliminating the backlog, other factors may come into play which will influence our ability to achieve it. For example, biodiversity and wildlife requirements may mean leaving some areas unstocked or at reduced stocking levels.

1992 - Commission on Resources and Environment

Although not directly involved with reforestation, the Commission on Resources and Environment (CORE), established by law in 1992, has a mandate to "develop for public and government consideration a British Columbia-wide strategy for land use and related resource and environmental management" (CORE Act, s.4(1)). CORE has recently recommended a provincial land use strategy, to be supported by a recommended Sustainability Act (CORE, 1994). This, together with a number of other generally well-received CORE recommendations, such as regional land use plans. community resource boards, and dispute resolution mechanisms, sets a framework within which the recent positive public opinion on issues related to reforestation reside.

1994 - Forest Practices Code

The Government of British Columbia recently passed the Forest Practices Code of British Columbia Act. This Act, along with Regulations, Standards and Field Guides forms the Forest Practices Code. The guiding principle behind the Code is the sustainable use of the forests we hold in trust for future generations. In response to public concerns about forestry practices, the Act puts the force of law into changing the way the forests

are managed in British Columbia.

The Code brings together under one umbrella many rules and regulations governing forest practices that were scattered over many hundreds of documents. For example, the Code now embodies the rules and regulations which came about following the 1987 policy and legislation changes mentioned previously. These include such matters as species diversity, stocking standards, and free-growing standards for newly reforested areas.

The Forest Practices Code addresses public concerns on clearcutting, first, by setting mandatory limits on the size of cutblocks, and secondly, by requiring a silvicultural system other than clearcutting be used in specified circumstances, such as:

- on sites with unstable terrain;
- where it is incompatible with visual objectives;
- in wildlife habitat areas where the forest canopy is essential to maintain the animal population;
- in old-growth management areas; and
- along important fisheries streams or main streams in community watersheds.

The Code places considerable emphasis on protecting forest soil from excessive disturbance due to logging road construction, skid trails and silvicultural systems. Terrain hazard assessments and mapping of sensitive soil areas are now required across the entire province.

1994 - Forest Land Reserve Act

The recently passed Forest Land Reserve Act enables Crown and certain private managed forest land to be placed in a forest land reserve. Processes for removing lands from the reserve are designated. The Act also enables the new Forest Practices Code to apply to private lands within the reserve. This will tighten specifications and controls on reforestation of these lands following harvesting.

1994 - Forest Renewal Plan

The Forest Renewal Plan was established by legislation in 1994. The plan targets an estimated $400 million a year from increased stumpage and royalty revenues for investment in the forests, the people who work in the forests and their communities. Planned silviculture expenditures by the fund were $32 million in 1994. Projects include afforestation of marginal agricultural lands, conversion of non-commercial brush areas to productive forest, and pruning and spacing to create high quality stands.

Improved Silviculture Practices and Regeneration Success

Better Seedling Survival

Seedling survival rates have increased substantially over the last few years from 54% in 1982 to 87% in 1988 and have remained at or above this level since then (Figure 6). This can be attributed to a number of factors which are covered in the following sections.

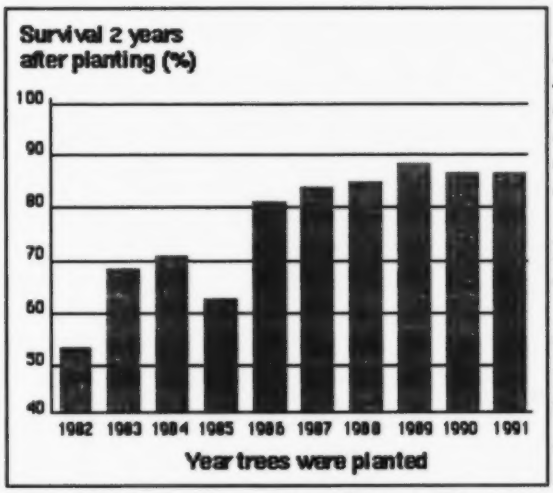

Figure 6. Average seedling survival all species and stock types has increased from 54% in 1982 to 87% in 1988 and has remained at or above this level since then.

New Biogeoclimatic Classification System

Since the early 1980's, British Columbia has been implementing an ecologically-based management system unparalleled in scope and usefulness. The biogeoclimatic classification system uses climate, soil and vegetation data to identify over 600 different ecosystems. Today, foresters are using this system to make sound ecological decisions for every treatment they prescribe, including species selection.

Nineteen tree species, as well as spruce hybrids, are now being planted in the province. Two or more tree species are now often planted in combination on the same site.

Maintaining biodiversity over such a broad range of ecosystems is a challenge. However, a 1992 study found that, whereas 32% of forests are monocultures before harvesting, only 29 % of new forests were monocultures 5-15 years after harvesting, primarily due to the in-growth of natural seedlings (B.C. Ministry of Forests, 1992). Using guides based on the biogeoclimatic classification system, foresters prepare silviculture prescriptions which, by law under the Forest Practices Code, must plan to maintain biodiversity.

Improved Stock Types and Seedling Vigour

In 1993, 33 different stock types were grown in B.C. nurseries, compared to only nine stock types in 1987. Over 27% of the seedlings being grown are large stock types, an almost six-fold increase in the last seven years.

Approximately 90% of the seedlings currently being grown in the

province's nurseries are in containers, the remainder being bareroot. Improved nursery culture, as a result of a competitive nursery business, has provided high quality seedlings at a reasonable price.

A great deal of training in careful stock handling has been directed at workers involved in the planting program. As a result, seedlings are remaining vigourous from the nursery to the planting site.

Genetically Improved Seed

New legislation requires that, where available, genetically improved seed must be used. Tree breeding programs are now providing an ever increasing supply of genetically improved seed for the reforestation program. Approximately 25 million seedlings were planted in 1993 from such seed and by the year 2000 it is forecast that 50 % of the seedlings, or about 100 million, will be from such seed.

More and Improved Site Preparation

There is a greater emphasis on tailoring site preparation to the forest ecosystems being treated. From 1982 to 1987 the amount of site preparation on Crown land more than tripled (Figure 7). Foresters have responded to public opinion and have significantly reduced burning in favour of mechanical site preparation. In 1993, the amount of area prepared by mechanical means (98 000 ha) was more than double the area prepared by prescribed fire (41 000 ha), whereas as recently as 1987 the relative proportions were the reverse. Better techniques and equipment, and lower costs, have made the switch possible. Disc trenching and

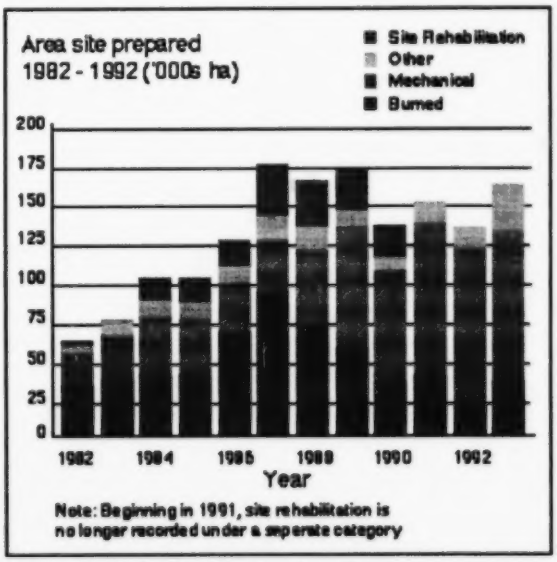

Figure 7. Prescribed burning has given way to mechanical site preparation.

mounding are now the most common types of site preparation in B.C.

Brushing and Spacing

Young seedlings must be protected from brush and excessive tree competition which would choke them out or seriously inhibit their growth. Over the last eleven years, both brushing and spacing have increased substantially.

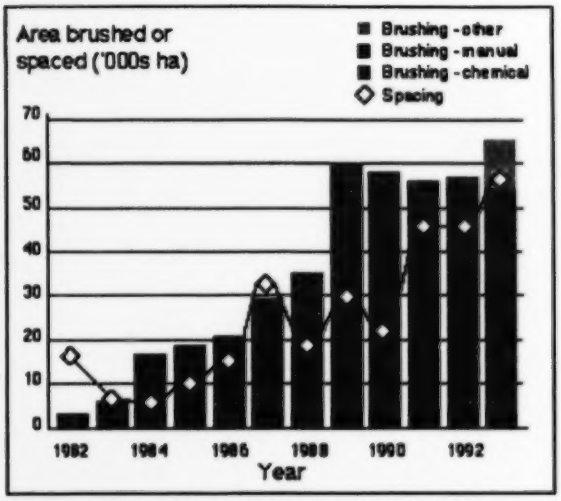

Figure 8. The total area brushed and spaced has increased substantially over the last 11 years. Chemical brushing has decreased recently in response to environmental concerns.

A national poll indicated that a large majority of people (71 %) oppose the use of chemicals in the forest to control brush (Environics, 1989) . As a result, the amount of chemical use in B.C. decreased between 1989 and 1991 (Figure 8). It has remained relatively constant at this lower level since then.

Chemicals are now used as one of many available treatment options in the control of brush. Manual methods and the use of sheep grazing for brush control have increased considerably.

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Summary and Concluding Remarks

Over the last 10 years there has been dramatic improvement in reforestation in British Columbia, responding to widely held public opinion that inadequate reforestation was unacceptable. New legislation demands that every area of managed Crown forest land harvested must be regenerated within strict time-frames, either naturally or by planting. With the aid of the biogeoclimatic ecosystem classification system, silviculture prescriptions are now resulting in higher seedling survival and growth.

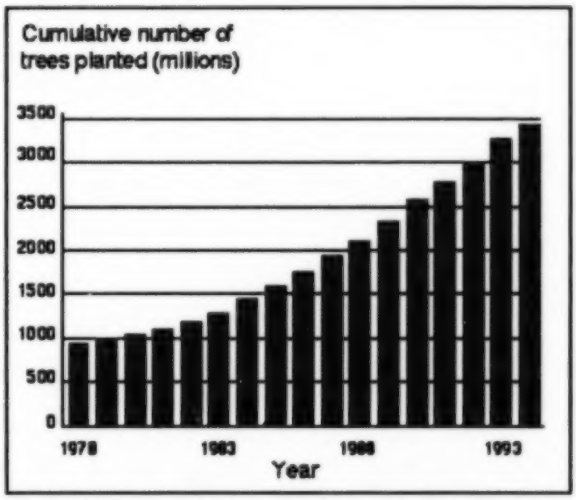

Figure 9. The cumulative total of trees planted in British Columbia was 3.4 billion in 1994. At current rates, more than 1 billion trees are being planted ever 5 years.

By the end of 1994 approximately 3.4 billion trees have been planted on 2.9 million hectares (Figure 9), not quite one and one-half times the land area of Wales. More than 200 million trees are planted annually.

Due to the changes in policy and legislation, more area has been reforested than harvested in British

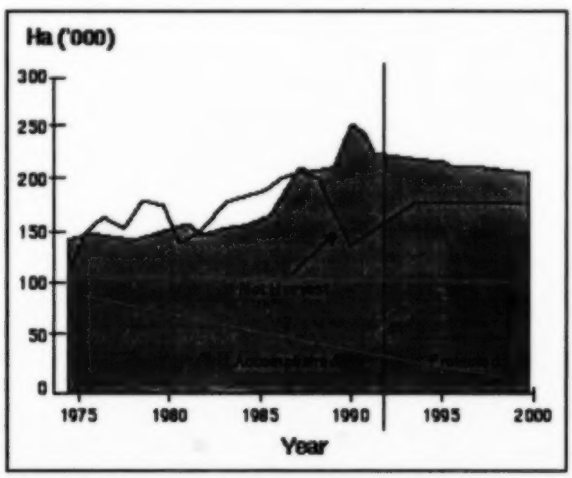

Figure l0. More area has been reforested than harvested in

Columbia each year since 1987 (Figure 10). It is expected that shortly after the year 2000 the regeneration program will be in balance with the area harvested, as all of the accumulated backlog NSR will have been eliminated and currently harvested areas must be regenerated by law.

B. C. each year since 1987.

In conclusion, it is evident from information presented in this paper that public opinion, when strongly and widely held, can bring about substantial change in forest policy and practices. In B.C. this has resulted in a program of full reforestation after harvesting, elimination . of the backlog NSR, and changes in forest practices as evidenced by the new Forest Practices Code. Perhaps most heartening, for those in the midst of what sometimes seems to be an endless series of demands, is that the public can indeed be satisfied. This is evidenced in British Columbia by the reduction in the level of concern over reforestation expressed through public opinion polls .

New challenges will continue to present themselves in the regeneration and management of British Columbia's forests, but there is now a solid foundation of success on which to build the future.

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Acknowledgements

Research and editing assistance provided by Mr. Larry Atherton of L. P. Atherton & Associates is gratefully acknowledged.

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Appendix

Region **Commercial Tree Species**

	Common Name	Botanical Name
Coast Mountains and Islands	**western hemlock**	Tsuga heterophylla
	western red cedar	Thuja plicata
	amabilis fir	Abies amabilis
	Douglas fir (s. portions)	Pseudotsuga menziesii
	yellow cypress	Chamaecyparis nootkatensis
	sitka spruce	Picea sitchensis
	western white pine (s. portions)	Pinus monticola
	grand fir (s. portions)	Abies grandis
	mountain hemlock (higher elev.)	Tsuga mertensiana
	subalpine fir (higher elev.)	Abies lasiocarpa
	red alder	Alnus rubra
	black cottonwood	Populus trichocarpa
Northern and Central Plateaus and Mountains	**lodgepole pine**	Pinus contorta
	white spruce	Picea glauca
	hybrid white/Engelmann spruce	Picea glauca x engelmannii
	subalpine fir	
	black spruce	Picea mariana
	trembling aspen	Populus tremuloides
Great Plains	**white spruce**	
	trembling aspen	
	lodgepole pine	
	black spruce	
	balsam poplar	Populus balsamifera
	white birch	Betula papyrifera
Interior Plateau	**Lodgepole pine**	
	Douglas fir (s. half)	
	White spruce (n. half)	
	Engelmann spruce (s. half)	
	hybrid white/Engelmann spruce (n. half)	
	subalpine Flr (n. half)	Pinus ponderosa
	ponderosa pine (s. drier parts)	
	black spruce (n. portions)	
	trembling aspen	
	black cottonwood	
Columbia Mountains &	**western hemlock**	

Southern Rockies	**western red cedar** **Douglas fir** **Engelmann spruce** **white spruce** **hybrid white/Engelmann spruce** lodgepole pine mountain hemlock (high elev.) subalpine fir western larch western white pine ponderosa pine (drier parts) grand fir (sw. portion)	Larix occidentalis

Table 2. Commercial Tree Species of B.C.'s Five Physiographic Regions. Major Species are highlighted in bold.

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